



Enclosure

***National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility***

Wallops Flight Facility Mission 2005

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Executive Summary

Wallops Flight Facility (WFF) Mission 2005

In 1997 NASA's Goddard Space Flight Center (GSFC) developed the Wallops Mission 2000 Implementation Plan to ensure WFF's continued relevance and alignment to meet NASA's goals as articulated by the Agency's Strategic Plans. Wallops Mission 2000 also captured unique WFF partnership assets to supplement NASA's capabilities, to meet national defense goals through the Navy's AEGIS system, and to promote commercial aerospace economic development through partnership with the Virginia Commercial Space Flight Authority (VCSFA).

The fundamental goals of Wallops Mission 2000 remain valid. Many of these goals were accomplished. Some were not, however, in large measure because of changes in the external environment. Consequently, NASA has updated these goals and has developed modified strategies that capitalize on successes and addresses those issues that precluded some goals from being met.

The updated WFF mission was developed with the goals of leveraging the unique capabilities of WFF and providing high value to NASA's Enterprises, while ensuring stability and a bright future for the facility and its workforce. The strategic vision for Wallops Mission 2005 has three primary mission themes that align with and support Enterprise and Agency goals.

VISION

Wallops Flight Facility will be a national resource for enabling low-cost aerospace-based science and technology research.

INTERNAL ASSESSMENT

WFF is a national resource with the facilities, personnel, core competencies, and low cost of operations to provide world-class, end-to-end services (i.e., project initiation through operations to data delivery) for small to medium-sized missions. It is a fully capable test range, including launch facilities, a research airport, mobile range capabilities, range instrumentation engineering, range safety, flight hardware engineering, and mission operations. A partnership with the Navy provides additional state-of-the-art range capabilities that can be employed in a joint operational manner, making the WFF range potentially the most capable in the world. Its partnership with the VCSFA provides additional capabilities and offers attractive commercial benefits that include non-NASA capital investments, free trade zones, and other benefits that will ultimately enable the commercial development of space. WFF's formalized collaboration with KSC to enable development of advanced range technologies provides a powerful, strong, and continuing alliance for Agency activities aimed at improving safety and reducing costs of launch operations.

The carrier systems that are an integral part of the Wallops mission—airplanes, balloons, sounding rockets, and small payload carriers for the Shuttle—enable the Agency to meet many of its goals in scientific research, technology, and instrument development. Missions flown on these carriers

provide training for many young scientists and engineers who are later involved in larger orbital programs. This same fleet of carriers is a valuable resource for meeting the Agency's educational outreach goals.

WFF offers extremely cost-competitive fabrication and testing facilities. Facility and institutional costs are reduced by implementing full-cost sharing methodologies with its tenants and partners. Further partnership initiatives, including a combined base operations contract similar to the KSC/Cape Canaveral model, will make WFF even more cost competitive for NASA work. This environment provides the Agency with its lowest cost option to accomplish the WFF mission themes.

WFF Mission 2005 will serve as a strategic planning roadmap for WFF programs and facilities to the year 2005 and beyond, taking strategic advantage of its unique combination of NASA, commercial, and academic resources. The plan focuses NASA civil servants on high-risk, cutting-edge technology development and inherently governmental functions, with commercial and other non-Governmental entities providing operational support to the Agency's mission. It reflects and takes advantage of the natural synergies between the NASA Centers and the GSFC's WFF that should drive strategic partnerships among these facilities.

WFF MISSION THEMES

The following Mission Themes continue and expand existing WFF activities and include several new proposals that are discussed in detail within this plan.

Enabling Scientific Research

Support the Earth and Space Science Enterprises by providing low-cost, highly capable suborbital and orbital carriers, mission management, and mission services to enable Earth and space science research.

- Provide research carriers and science platform missions, including sounding rockets, balloons, aircraft, and carriers for Shuttle, and provide brokering services for other carriers such as Uninhabited Aerial Vehicles (UAV's) and non-NASA aircraft.
- Develop new technologies and applications for WFF carriers such as use of balloons for planetary and Earth science missions, and sounding rockets for planetary entry demonstrations.
- Develop, manage, and implement small orbital science missions.
- Provide specialized mission services through use of the WFF Test Range.
- Conduct Earth science measurements supporting global climate change and coastal research.
- Lead the application of balloon technology to Mars Exploration missions as selected or assigned.

Enabling Aerospace Technology and Facilitating the Commercial Development of Space

Support the Aerospace Technology and Human Exploration and Development of Space Enterprises by providing advanced aerospace technology development, testing, operational support, and facilitation of the commercial launch industry to enable frequent, safe, and low-cost access to space.

- Serve as a NASA test site for demonstrating space launch technologies.
- Support development advanced range technologies that improve safety and reduce launch costs.

Enabling Education, Outreach, and Innovative Partnerships

Support other NASA goals and objectives by providing science and technology education and outreach programs including innovative partnerships with academia, other Government agencies, and industry.

- Provide student flight projects to teach students the processes associated with conducting aerospace and scientific research.
- Seek new opportunities to collaborate with regional colleges and universities, especially Historically Black Colleges and Universities (HBCU's).
- Continue efforts with WFF tenants and regional government organizations to create new business opportunities for WFF.

**National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility (WFF) Mission 2005**

I. Introduction/Background

In 1997, Goddard Space Flight Center (GSFC) developed the Wallops Mission 2000 Implementation Plan. This plan was chartered by the NASA Administrator to address the impacts of programmatic and workforce restructuring affecting WFF. The plan provided strategies designed to ensure WFF's continued relevance and alignment with NASA's goals. The Wallops Mission 2000 Implementation Plan was endorsed by the Administrator and unveiled in a public ceremony on July 21, 1997.

In 2001, the Conference Report (House Report 107-272) accompanying the FY 2002 VA-HUD and Independent Agencies Appropriations bill (H.R. 2620) directed NASA to update the Agency's strategic plan for the future of the Wallops Flight Facility, including NASA missions and other business opportunities.

II. Wallops Flight Facility Mission 2000 Accomplishments

Since the development of the Wallops Mission 2000, GSFC has strived to implement its strategies and has accomplished many of its goals. Major accomplishments include:

- Transition of the NASA Sounding Rocket Program to a performance-based contractor implemented mission approach.
- Development of the Ultra-Long Duration Balloon (ULDB) capability, providing for 100+ day duration missions. Flight-testing is currently underway, and a science ULDB mission is in development with several new concepts under study.
- Assumed Shuttle Small Payload Project (SSPP) and SPARTAN, including responsibility for implementation of the Get-Away-Special and Space Experiment Module, from GSFC/Greenbelt.
- Establishment of the University-Class Project Office, currently implementing UNEX and UnESS missions for NASA.
- Resolution of roles and responsibilities for WFF aircraft in support of the Earth Science Enterprise.
- Completion of several internal launch range studies used to assess the current state of the WFF Test Range. From these studies grew the Advanced Range Technology Initiative (ARTI), intended to leverage WFF capabilities to infuse new approaches to launch operations.
- A workforce realignment that focuses civil servants into inherently governmental project management, safety, and technology development positions.
- Implementation of the Wallops Refocusing Initiative, providing technicians and clericals with opportunities to complete undergraduate education programs to support the needs of the new WFF mission.
- Establishment of necessary agreements and formation of an innovative partnership with the VCSFA to foster the use of the WFF Test Range in support of commercial launches. VCSFA currently owns two expendable launch vehicle (ELV) launch complexes and is "open for business." NASA's WFF and VCSFA regularly team on competitive space launch and technology opportunities.
- Establishment of the Wallops Board of Directors, consisting of NASA and tenant organizations at WFF. Under the auspices of this partnership, WFF organizations collaboratively pursue common goals such as a new joint base operations contract, business development, employee welfare issues, and other areas of common interest.

III. Environment Changes Affecting the Existing WFF Mission

Since the development of the Wallops Mission 2000, environmental conditions that were assumed during the development of that plan have changed. Major challenges include:

- Commercial launch activity that has not materialized.
- Constrained NASA budgets and resulting changes in priorities have resulted in:
 - A reduction in the Wallops Tracking and Data Acquisition capabilities.
 - Deferral or cancellation of university-class Space Science (UNEX) and Earth Science (UnESS) missions.
 - Termination of Spartan Lite carriers.
 - Suspension of the Office of Space Science Student Launch Program that provides sounding rocket and balloon mission opportunities to undergraduate students.

Major new opportunities include:

- “Inspire the Next Generation of Explorers” which has been made a core element of the NASA mission, suggesting the desirability of an expansion of existing WFF professional development, education, and outreach activities, including innovative partnerships with academia, other Government agencies, and industry, resulting in a strong, intense focus for the Agency’s hands-on student activities.
- Expansion of Navy tenant programs at WFF as a result of stronger emphasis on next-generation ship systems and ballistic missile defense.
- Continued Maryland and Virginia State and regional government interest in WFF as a catalyst for economic growth.

IV. Wallops Vision and Mission

During its early history, WFF's mission was primarily to serve as a test site for aerospace technology experiments. Over the last several decades, the WFF mission has evolved toward a focus supporting scientific research through carrier systems and mission services. Under Wallops Mission 2005, WFF proposes to rebalance its mission, continuing its strong mission and technology support for the science community while renewing emphasis on support to NASA’s aerospace transportation goals. This rebalancing will provide for a more effective utilization of WFF capabilities, lead to lower program costs, and provide stability to currently underutilized resources.

To accomplish these diverse objectives, WFF proposes the following vision statement:

Vision: **Wallops Flight Facility will be a national resource for enabling low-cost aerospace-based science and technology research.**

To meet this vision, WFF will implement a focused, multifaceted mission whose individual themes align with the different strategic objectives of the Agency and Enterprises:

Mission: **Wallops Flight Facility will:**

- Enable scientific research through the development and deployment of low-cost, highly capable suborbital and orbital research/payload carriers and science platform mission services.
- Enable aerospace technology and facilitate commercial use of space through advanced technology development, testing, operational support, and facilitation of the commercial launch activity at WFF.
- Enable education, outreach and innovative partnerships by providing science and technology educational opportunities, and pursuing innovative partnerships with academia, other government agencies, and industry.

V. Mission Themes and SubElements

Enable Scientific Research

NASA's Science Enterprises sponsor research with the goals of better understanding how the universe began and evolved; the Earth system and its response to natural and human-induced changes; and the physical, chemical, and biological factors involved in space travel and Earth applications. In support of these questions, it will be WFF's mission to provide frequent, low-cost, customer-focused, end-to-end flight projects and other supporting services that enable NASA's researchers to take discrete and long-term measurements leading to breakthrough discoveries. WFF will support the science community through:

- Research/Payload Carriers and Science Platform Missions:
WFF will provide management and implementation of low-cost, highly capable and reliable research carriers for the science and technology communities. Sounding rockets and balloons will continue to provide frequent low-cost flights in support of in-situ or other specialized space science research missions and will serve as a training ground for experimenters who will later participate in larger, observatory-class missions. An increase in sounding rocket missions is projected, following a decline in recent years due to reduced science and program budgets, and continued growth in complexity of these missions is expected. WFF science aircraft will serve as the Earth Science Enterprise's primary platforms for low-altitude atmospheric oceanographic, coastal zone and land centered research missions. The Get-Away Special (GAS)/Space Experiment Module (SEM) provides a means for research and educational outreach opportunities with small payloads as tertiary payloads aboard the Space Shuttle

Where the science community establishes requirements that cannot be satisfied by carriers made available by WFF, WFF will pursue solutions through technology development and external sources. WFF will maintain cognizance of other resources such as available non-NASA aircraft and UAV's. It will seek to broker these capabilities seamlessly to NASA researchers.

WFF will continue to develop new uses and improved capabilities for carriers under its management to meet customer requirements, enable new missions and improved measurements. WFF will continue efforts to expand use of suborbital carriers under its management to customers other than their primary sponsor, such as other NASA Enterprises and the Department of Defense

(DOD), in order to assist the goals of these programs and to spread carrier fixed costs across a larger user base. Other plans include:

- Development of a new fine-pointing attitude control system to increase quality of scientific measurements conducted on sounding rockets.
 - Use of sounding rockets to demonstrate planetary entry bodies, in collaboration with Ames Research Center and other interested parties.
 - Leveraging the technologies of the Ultra-Long Duration Balloon (ULDB) to support planetary research missions, including collaborative Mars missions with the Jet Propulsion Laboratory.
 - Developing balloon trajectory control, station-keeping techniques, and "smart balloon" aerobots to enable autonomous flight control and formation flying platforms for Earth science and planetary applications.
 - Continuing advancements of the ULDB to produce next-generation balloon systems capable of longer duration missions.
 - Investigating opportunities for involvement in inflatable space structures.
 - WFF will collaborate with industry, the Federal Aviation Administration (FAA), and other interested parties, in cooperation with other NASA Centers operating UAV's, to address operational and regulatory challenges that currently preclude their effective use in support of Earth science.
- Mission Services:
The WFF Test Range will continue to provide its unique services that are necessary to support the special operational requirements of scientific missions. This will include the need to conduct launch operations based on dynamic science phenomena (e.g., thunderstorms, auroras) on short notice, over extended periods, or at remote locations (through use of the WFF Mobile Range). The Range will continue to augment its ground science instrumentation as part of a "WFF Geophysical Observatory" that will enable launch operations to be coordinated with ground measurements, enhancing the value of the rocket-borne measurements.
- The orbital portion of the WFF-managed Ground Network, which provides tracking and data acquisition of NASA low-Earth satellites, is scheduled for commercialization in the near future. The impact of commercialization on the current WFF contractor workforce is currently unknown, as the commercial vendors will ultimately determine how to provide data services to NASA in the future. WFF will continue to develop orbital tracking technologies that offer promising new capabilities and lower cost data services.
- Earth Science Research:
The Observational Sciences Branch (OSB) will continue to study phenomena that support Earth Science Enterprise research interests. OSB will develop new instruments, conduct laboratory research, and conduct worldwide airborne measurements using rockets, balloons, aircraft, and satellites. Ongoing topics include monitoring changes to the Greenland ice sheet, measuring ocean wave spectra, developing atmospheric profiling instruments, and providing on-going support to TOPEX, SeaWiFS, Terra, and TRMM missions. OSB plans to pursue new activities such as the use of WFF as a calibration and validation site for the Global Precipitation Measurement project.

Consistent with direction from the Earth Science Enterprise and the GSFC Earth Sciences Directorate, WFF will generate an implementation plan, a road map, and a partnering plan to establish a Coastal Zone Research Consortium at the WFF.

These subelements together provide a synergistic, powerful, and comprehensive set of services that will help the Science Enterprises reach their goals of scientific discovery in the reliable, cost-effective manner that WFF has provided throughout its history.

Enable Aerospace Technology and Facilitating the Commercial Development of Space

It is the mission of NASA's Aerospace Technology and Human Exploration and Development of Space Enterprises to maintain this Nation's preeminence in aerospace research and technology and to enable the development of space for human enterprise. The resource investment by NASA in the WFF Test Range and the experience and expertise of WFF personnel provide valuable capabilities that will assist NASA in Ensuring routine, low-cost access to air and space and in facilitating the growth of the commercial space launch industry. A 56-year heritage of providing launch range services, established partnerships with the State of Virginia, DOD, and industry, and an in-depth understanding of and dialog with the launch industry provide powerful tools to address challenges currently facing the space transportation community. NASA is currently investing in key areas intended to reduce the technology risk of next-generation space transportation systems.

- WFF Advanced Range Technology Initiative (ARTI):
The WFF ARTI was established in 1998 to use WFF's capabilities and expertise in launch operations to address needs and opportunities to improve the operational and safety aspects of space transportation. The mission of ARTI is to pursue focused technologies and processes that offer substantial near-term solutions to current problems involving cost, safety, and effectiveness of ground and flight systems that interact with launch ranges. WFF's intimate knowledge and experience in ground and flight systems, through support of many different vehicles and providers, has created an in-depth awareness and understanding of the common issues that impact cost and schedule. ARTI technologists are developing new concept prototypes and processes that focus on areas of near- to mid-term benefits. The strength of this program is the ability to rapidly prototype and to demonstrate promising technologies through the use of WFF's Test Range, sounding rockets, balloons, and aircraft. This program recently demonstrated the potential of using a commercial communication satellite constellation as a space-based data relay system that ultimately may eliminate the need for down range tracking stations in support of space launches and other applications, possibly saving hundreds of thousands of dollars per mission. ARTI has been highly touted within NASA and the space launch community for its accomplishments and its potential benefits, but its future is uncertain due to unknown sources for future funding. Through an existing and growing collaboration with NASA's Kennedy Space Center in range technology programs, substantial improvements in cost and effectiveness of space transportation operations can be realized. Through implementation of the full ARTI strategy, WFF will develop and demonstrate an integrated next-generation range architecture that offers increased capabilities and millions of dollars of savings to NASA and other ranges annually.
- Facilitating the Commercial Launch Industry:
NASA is currently implementing strategies that reduce the technology risk associated with development of the next generation of launch vehicles. Vehicle developers, however, face a number of other challenges associated with becoming viable providers. These challenges include

safety, range interface, and launch site certification issues. WFF proposes to serve as an important resource for working with industry to address critical range-related issues that impede or otherwise impact the domestic launch industry's ability to be internationally competitive.

WFF proposes that its Test Range serve as a facilitating proving ground for emerging commercial vehicle designs. In this role, WFF will provide low-cost traditional range services and safety, but position itself to collaborate with the providers, as requested, during the design, development, and testing phases to offer counsel on concurrent engineering and identification of optimal solutions compatible with range facilities, instrumentation, and safety requirements.

WFF also proposes to increase its collaboration with the FAA to provide supporting expertise and continued training related to FAA safety, regulatory, and launch licensing activities, thereby providing safety to the public while minimizing the impacts to launch providers.

WFF proposes to support the emergence of new "spaceports" as the launch industry grows by providing expertise and other available resources to educate these organizations in the resources, procedures, and other issues involved with providing range and spaceport services to the launch industry. It will collaborate in this effort with associated activities being formulated with KSC. As opportunities for these spaceports mature, WFF will provide technical assistance, on a reimbursable basis to aid them in establishing self-sufficiency.

- Supporting Aviation and Airport-Related Research:

The WFF Research Airport will continue to serve as a prime NASA resource for supporting aviation and airport-related research. In support of LaRC, the FAA, and other organizations seeking to improve aviation technologies and operations, the Research Airport provides an ideal venue to conduct research in acoustics, runway friction, aviation and airport terminal area safety, air and ground-based instrumentation systems, and other key topics that focus on assuring safe, efficient, and cost-effective aviation for the future. In addition to supplying airport facilities and controlled airspace, WFF will provide project management, safety, instrumentation and engineering services that help meet project goals.

WFF's activities within this theme can be implemented in a highly efficient manner through the existing NASA and VCSFA investments in the WFF Test Range. Increased participation by WFF in support of NASA's space transportation program, including the Space Launch Initiative (SLI), as described in Appendix I, could enhance the opportunities for accomplishment of its objectives.

Enable Education, Outreach and Innovative Partnerships

WFF will serve as a leading NASA provider of educational outreach opportunities, seeking to inspire the nation's next generation of scientists and engineers. WFF has a strong history of supporting education and the professional development of NASA employees, and its breadth of flight projects and end-to-end mission capability make it ideally suited to serve as an education center to teach persons of any age the opportunities and practices associated with accessing and conducting research from space. WFF strategy for providing

leadership for Agency student hands-on objectives is discussed in Appendix II. Specific activities supporting this strategy will include:

- Student Flight Programs:

WFF will continue to implement the Space Science and NASA Student Involvement Program student launch activities, provided adequate funding is available. These programs leverage the sounding rocket, balloon, and Shuttle payload activities WFF provides to NASA researchers to make available low-cost, hands-on opportunities for students to develop experiments, participate in mission preparations and operations, and acquire actual data in a space flight environment. These programs are available to students ranging from kindergarten through university level.

WFF will expand use of its carriers in support of educational goals by seeking out additional sponsors and targeting areas of particular interests to these sponsors. Special emphasis will be placed upon providing opportunities to historically disadvantaged organizations. WFF will pursue opportunities to expand the platforms that support educational flight projects.

Consistent with direction from the NASA Enterprises, WFF will generate an implementation plan and a roadmap for the establishment of a University Class satellite Program at WFF. This program is intended to provide low-cost satellite opportunities to universities in support of science and technology outreach efforts by the NASA Enterprises.

- University and Other Educational Collaboration:

WFF will expand its collaborations with the university community, with special emphasis on regional and HBCU institutions. WFF will continue to seek opportunities to team with university investigators to develop proposals for competitive NASA research opportunities that fit WFF expertise and capabilities. WFF will also participate in outreach programs designed to help the technical programs of these schools. Opportunities for new or increased cooperation exist with Hampton University (an HBCU), Old Dominion University, University of Maryland, and the University of Maryland Eastern Shore (an HBCU).

WFF will continue its support of other educational activities designed to excite the Nation's youths about the space program. Of particular note is the Virginia Space Flight Academy, which WFF supports through use of its facilities and personnel.

- Professional Development:

NASA's Management Education Center at Wallops will continue to provide the professional development that develops the Agency's engineers, scientists, and business innovators into world-class professionals.

- Innovative Partnerships:

WFF will continue to pursue and establish innovative partnerships with external organizations whose objectives align with NASA's goals and WFF's mission.

The WFF Board of Directors, consisting of NASA and its tenant organizations, will continue to be a forum for addressing issues of joint interest such as institutional costs and services, joint business development, and employee welfare.

Mission support of Navy and VCSFA projects will continue to be a relevant part of WFF's mission, providing opportunities for future synergies and providing funding reimbursement that helps maintain critical WFF services. Particular emphasis will be placed on opportunities to leverage the WFF Test Range and sounding rocket services in support of DOD ballistic missile defense projects.

NASA will continue to grow its strong relationship with VCSFA in its mission of encouraging economic growth and education in aerospace. WFF will work with VCSFA to increase its role in space launch activities at WFF as a pilot/model for federal/state/industry partnerships and for spaceport operations of the future.

WFF will continue to work closely with regional government organizations to leverage WFF's capabilities in promoting smart regional growth that supports future WFF needs. This includes concepts such as cooperative institutional services and the development of a Wallops aerospace and educational research park.

VI. Summary

The Wallops Flight Facility Mission 2005 provides a framework for providing challenging work for employees of the GSFC's WFF. This vision affirms WFF's relevance within the Agency and defines a proactive role for WFF as part of NASA's solutions to the scientific and technological challenges the Nation faces in the new millennium.

The fundamental goals of Wallops Mission 2000 remain valid. This plan presents modified strategies to meet these goals, capitalizing on successes and addressing issues such as a changing external environment that have precluded some goals from being met.

In assessing WFF's most effective and appropriate role in support of NASA's strategies, primary consideration was given to leveraging the special strengths of WFF's personnel and infrastructure. These strengths include:

- Leadership in providing highly capable carrier systems.
- Unique national facilities for research and testing missions.
 - Fully capable midlatitude launch range.
 - Mobile range capabilities.
 - Research airport.
 - World-class instrumentation.
- End-to-end mission capabilities, from design through mission operations.
- Heritage focused on small, quick response, low-cost missions.
- Strong reputation for providing customer-focused support.
- Outstanding educational outreach activities with potential for growth.

The WFF Mission 2005 roadmap will provide an exciting, healthy future for the WFF workforce and will maximize the benefits of WFF capabilities to NASA. Through implementation of this diverse mission supporting each of NASA's Enterprises and other NASA priorities, the natural synergies of WFF

activities will provide advances in support of NASA's science and aerospace transportation programs, other government organizations, academia, and commercial industry.

Appendix I - WFF Support for the Space Launch Initiative (SLI)

The Aerospace Technology Enterprise, through SLI, is currently sponsoring technology development efforts designed to dramatically lower the cost and increase the safety associated with routine access to space. These efforts in developing advanced propulsion, airframes, avionics, and other subsystems leading to next-generation reusable launch vehicles will require flight test demonstration prior to their use in commercially available aerospace vehicles. The Conference Report 107-272 accompanying the FY 2002 VA-HUD and Independent Agencies Appropriations Act (P.L. 107-73) directed NASA to spend \$10M in FY 2002 “for infrastructure and technology upgrades to ensure WFF remains a viable asset for NASA’s use.” Consistent with this direction, WFF is undertaking selected range modernization upgrades by providing resources and expertise in a variety of areas that complement SLI activities. Specifically, WFF is using the \$10 million appropriation to:

- Provide Research Range flight demonstration services in support of advanced launch vehicle system prototypes.
- Develop advanced range technologies that integrate with advanced vehicle designs and offer cost effective and more agile missions.
- Offer cost effective sounding rockets as carriers for technologies requiring a particular flight profile and environment.
- Increase capabilities necessary to support specific Agency focuses, such as flight crew escape technologies.
- Develop increased payload and hazardous processing facility capabilities.
- Add liquid fueling capabilities that support next-generation launch vehicle technology requirements.
- Automate and streamline of mission preparation processes.
- Develop new ground instrumentation architectures that eliminate costly traditional networks.

Future WFF activities in support of SLI will be dependent upon SLI program requests and competitive selection.

Appendix II - Wallops Flight Facility Leadership in Inspiring the Next Generation of Explorers

WFF existing flight projects and supporting capabilities offer NASA the broad scope and the technical breadth of activities needed to systemically reach out, capture, and train our future explorers. Educational outreach activities, such as the Wallops Visitor Center, visitations to regional schools, and the Teacher Resource Laboratory offer the inspiration and tools to stimulate our youth. WFF's collaboration with the VA Space Flight Academy serves as a bridge between outreach activities and flight programs, through exciting programs that expose students to NASA facilities, personnel, and mission. Simple, low-cost suborbital rocket missions, and the Space Shuttle Space Experiment Module provide critical opportunities to demonstrate that science and technology can be fun for students during the critical grade and high school period while they are formulating their futures. More complex suborbital rockets, balloons, and payloads flown aboard the Space Shuttle serve as training grounds for engineers and scientists-in-training. Sounding rockets, balloons, scientific aircraft, and small shuttle payloads also support graduate and post-graduate researchers, by providing the flight opportunities that are used to conduct focused research and demonstrate new concepts as precursors to future observatory-class missions. In each of these programs, the resident WFF on-site capabilities assure students are actively engaged in a hands-on manner, in all phases of the mission.

In the future, consistent with Enterprise requirements and funding, WFF proposes to expand existing activities, establish new opportunities, and add new elements to on-going projects that assure the maximum possible opportunity for hands-on experience in exploring space. For example:

1. The space flight academy will be expanded through broader collaborations with states and other organizations to greatly increase the number of students reached per year
2. Flight rates of sounding rocket and balloon programs will increase to reach out to a younger spectrum of students.
3. Student experiment flight opportunities will be made available on WFF aircraft missions.
4. WFF will develop options for university undergraduates to develop and carry out stand-alone, orbital satellite missions.
5. New tools, such as Webcasting, will be used to offer ground and flight experiences to broader audiences.